

HARS Technical Evaluation Framework Peer Review

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How will you help us?

- **Number of specific technical issues**
- **Recommendations for improving the conceptual model for deriving HARS-Specific Values**
 - Receptor selection
 - Spatial and temporal elements of exposure
- **Addressing uncertainty in the derivation and use of HARS-Specific Values**
- **Approaches for using HARS-Specific Values as part of a weight-of-evidence that results in credible and consistent regulatory decisions**

Receptor Selection

- Current “generic” fish receptor is an amalgam of more than 10 species
- Species vary broadly in life history, behavior, and exposure to sediment
 - e.g., flounder vs. bluefish
- How to refine the assessment by focusing on specific species with high potential for exposure



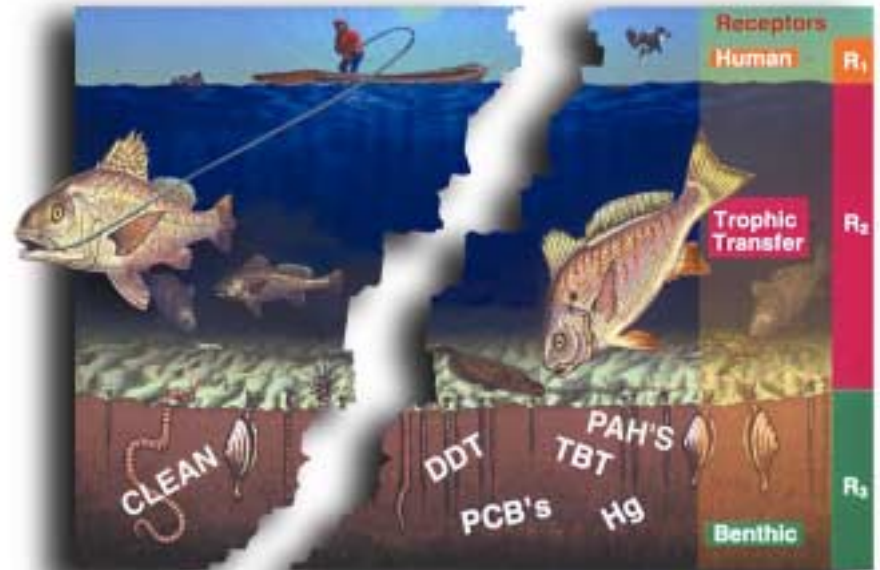
Receptor Exposure

- The current approach assumes 100% of the fish consumed by recreational anglers are exposed to the HARS 77.7% of the year
 - 77.7% is a weighted seasonal average for time in “NY Bight waters”
 - 16 sq. miles of HARS vs. 19,000 sq. miles of NY Bight habitat



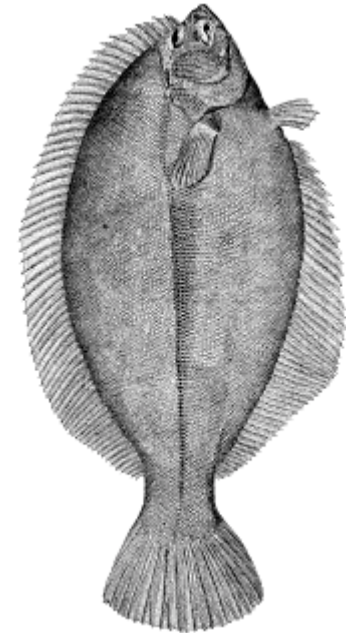
Spatial Elements of Exposure

- How do receptors of concern use the site?
- What is the likelihood for impacts within and beyond the spatial boundary of the HARS?
- The approach for addressing these spatial issues should be logical and gauged to match the decision-making context



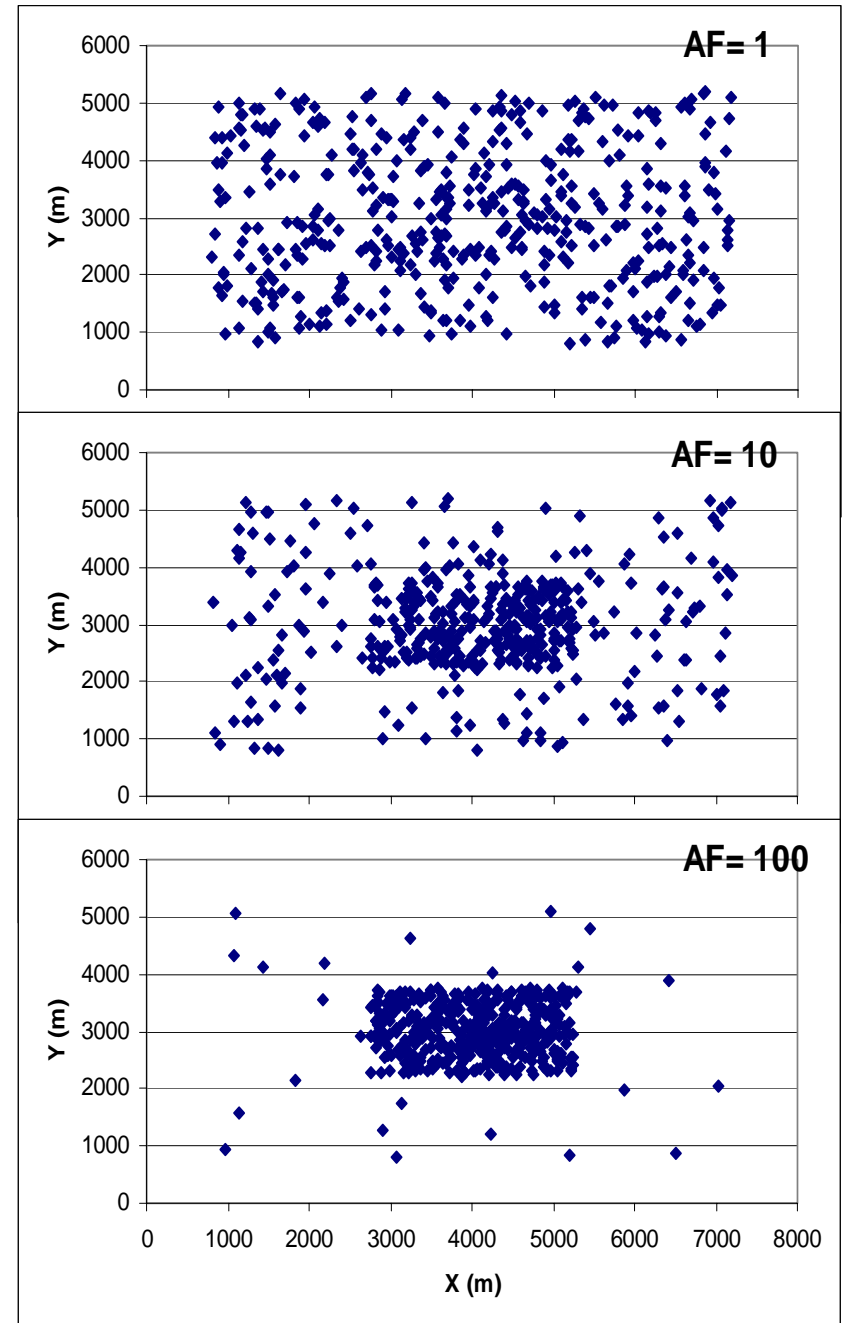
Spatial Elements of Exposure

- Assuming high site use during initial screening is accepted practice, but the HARS context requires a more definitive approach
- Space must be treated in a logical manner when making final regulatory decisions
 - Example, winter flounder
 - Annual catch is 500,000 fish for New Jersey recreational anglers alone
 - Average density for winter flounder is 0.01 fish/m²
 - Annual catch requires 50 km² of habitat
 - MDS= 7 km², PRA= 31 km²



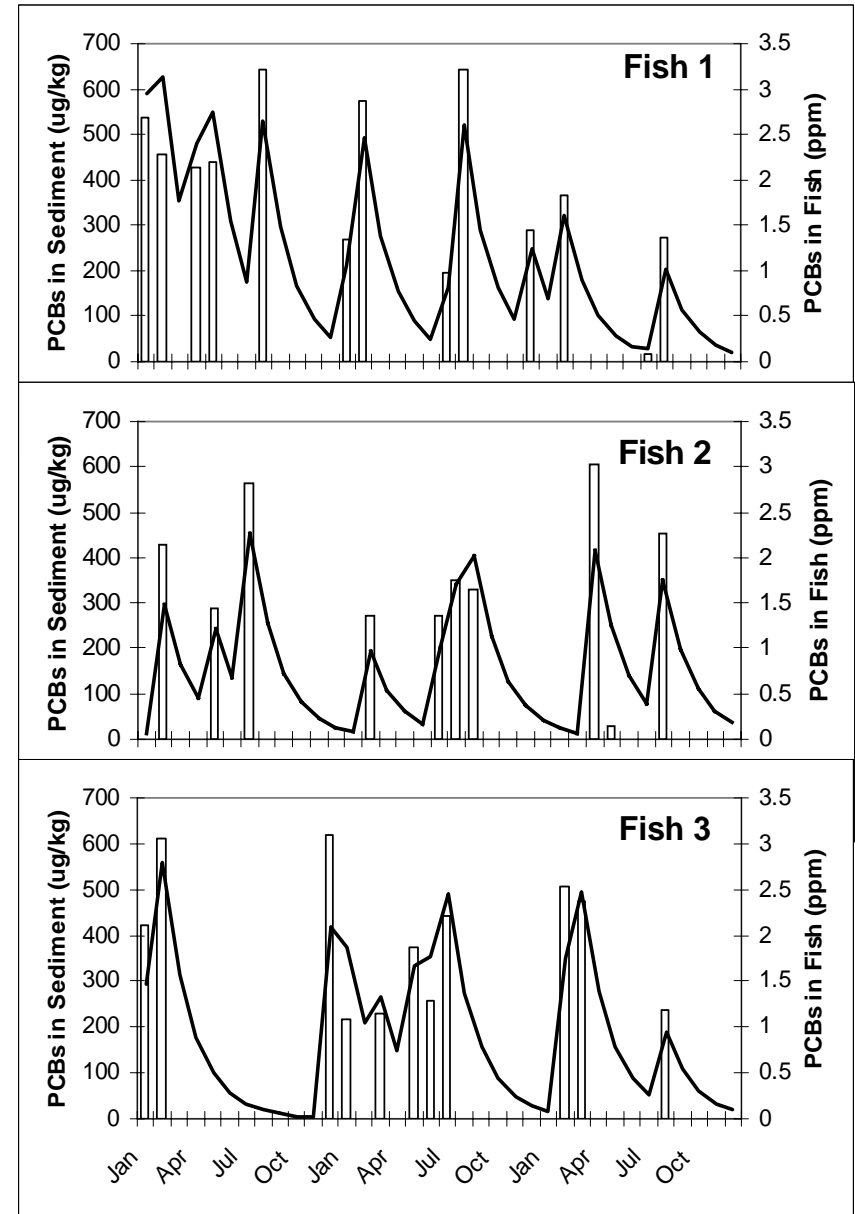
A Quantitative, Spatial Example

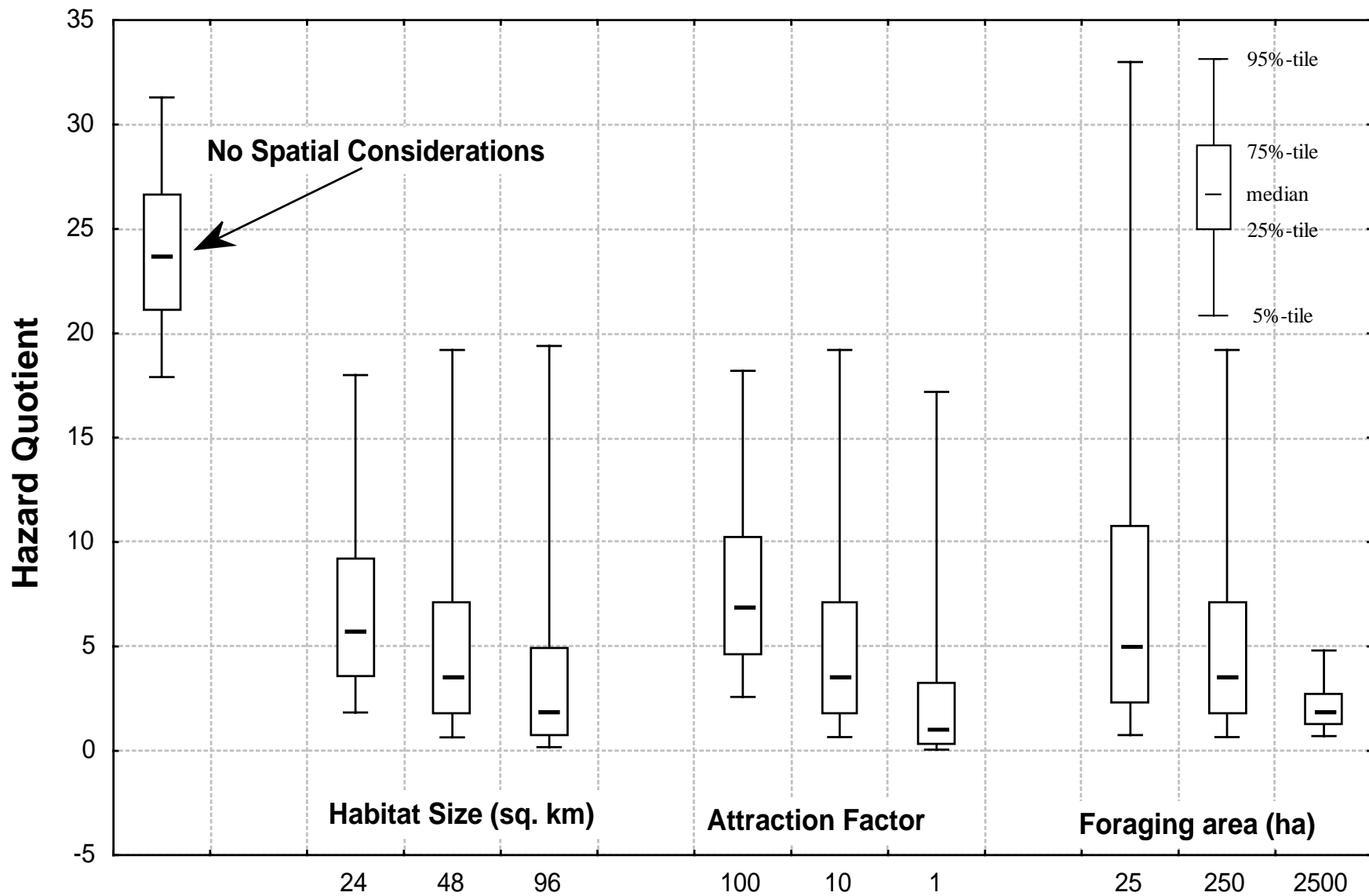
- Winter flounder exposed to PCB-contaminated sediment at a hypothetical site
- Fish foraging movement was simulated using published tagging data
- Habitat size was operationally defined as the area required to support regional catch



Spatial and Temporal Effects

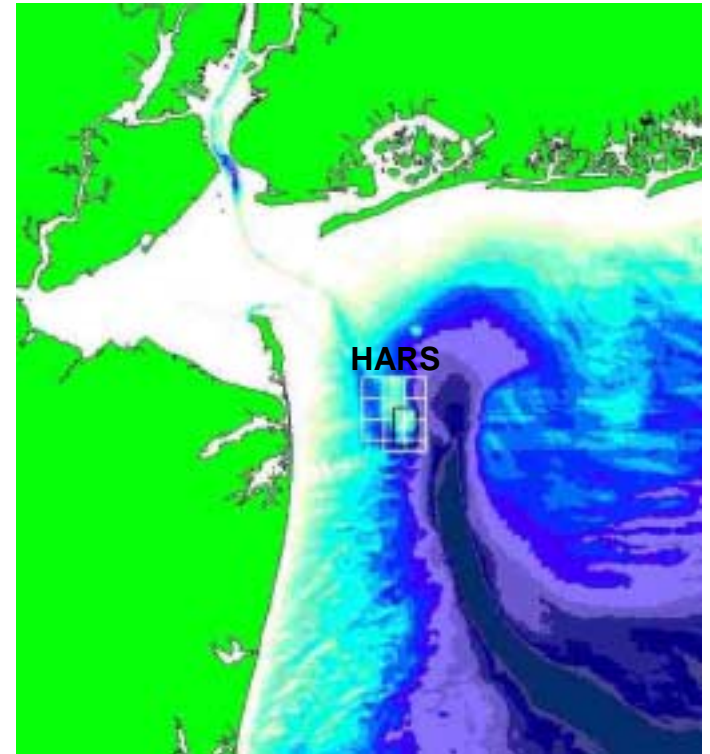
- **Bioaccumulation modeled using a time-varying, probabilistic model based on the approach of Gobas**
- **Framework provides means to address both the spatial and temporal aspects of exposure**





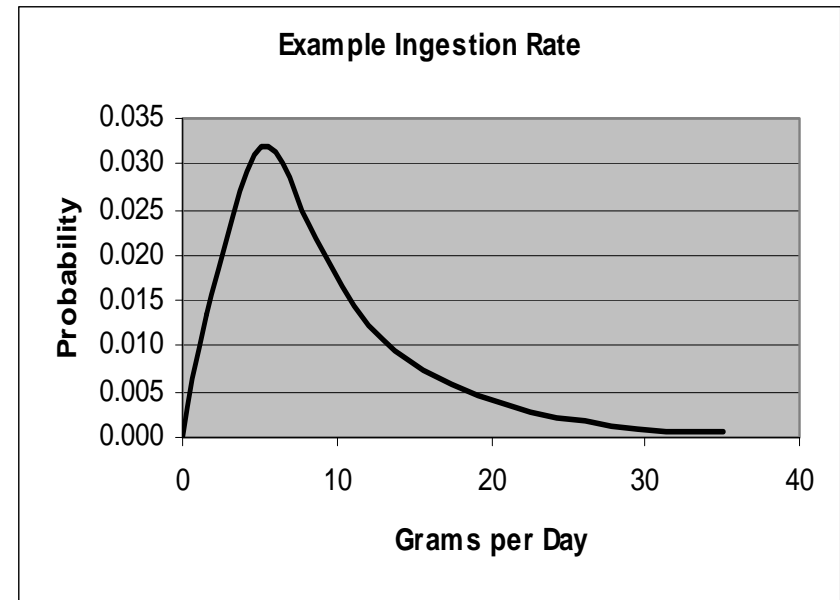
Other Considerations

- Should non-zero background concentrations outside the HARS be factored into the analysis?
 - How?
- What current risks do HARS sediments pose? Are these risks different than other NY Bight sediments?
- If contaminant concentrations within the HARS were brought to zero, would there be a measurable reduction in risk?



Uncertainty

- **The Corps and EPA must be accountable for addressing uncertainty in their assessments and decision-making**
- **What approach(es) can we use to establish confidence in the derivation and use of HARS-Specific Values**

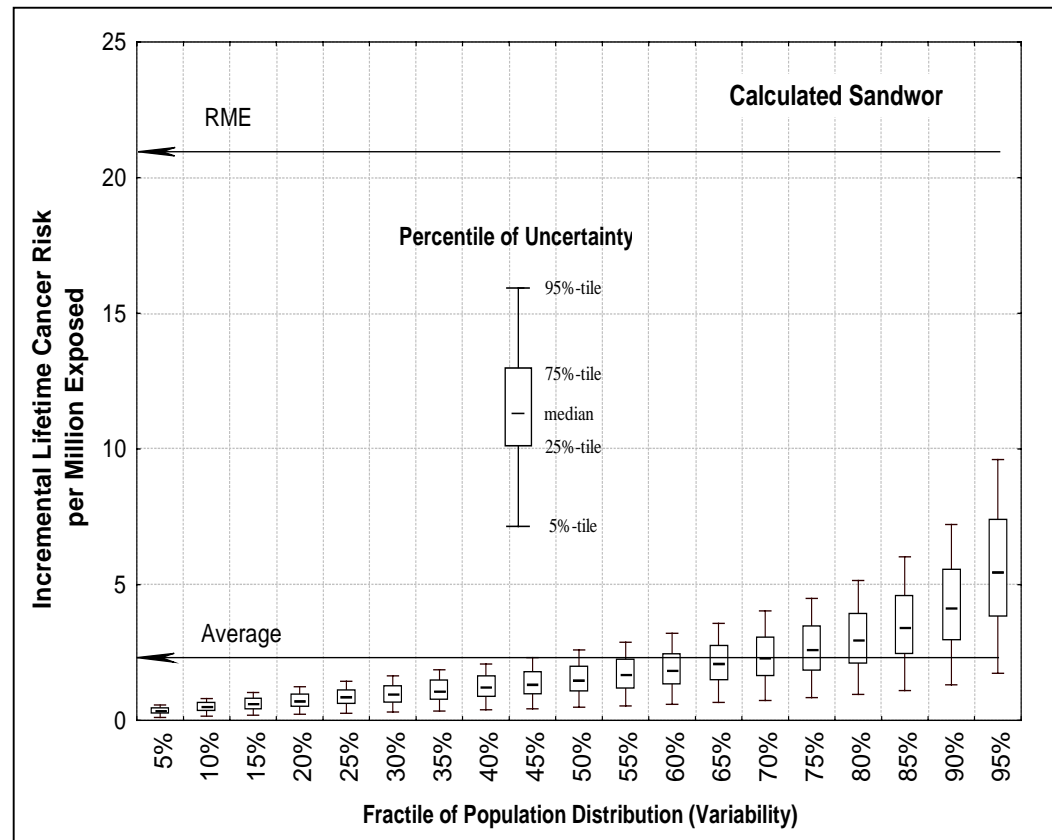


Uncertainty

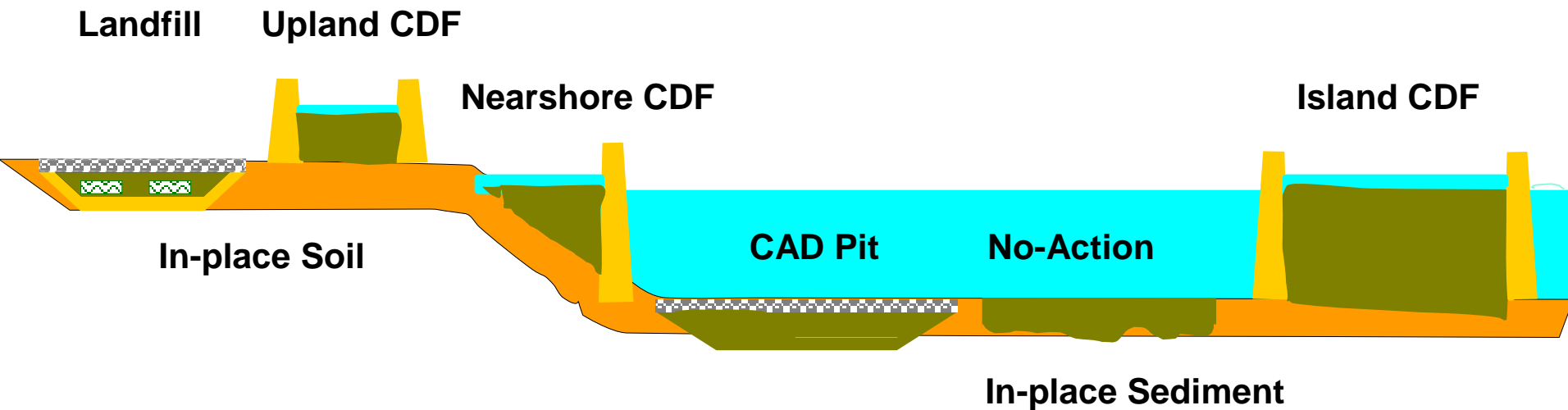
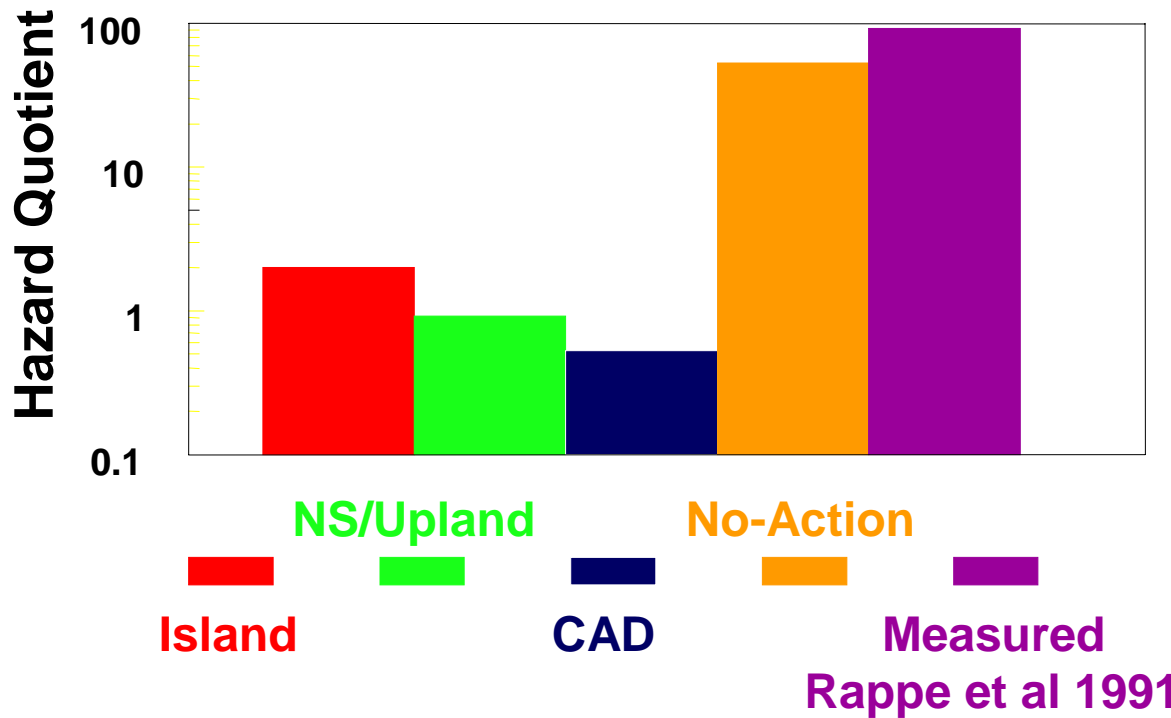
- **Risk variables in the current approach**
 - **Chemical concentration**
 - Currently, 80 analytes; more than 30 additional proposed
 - **Steady-state adjustment factor**
 - **Trophic transfer factor**
 - **Site-use factor**
 - **Whole-body/filet partitioning factor**
 - **Human ingestion rate for fish**
 - **Percentage of fish in target population diet from HARS**
 - **Body weight of human receptor**
 - **Exposure duration**
- **In the HARS context, selecting single point estimates for all risk variables is difficult to justify**

Application of 2-D Monte Carlo Analysis

- Human health risk evaluated by using mean, RME and probabilistic input parameters
 - RME always over-estimated risk
- Elements that must be balanced
 - Protection
 - Costs of unnecessary regulatory restriction
 - Remediating 9 sq. miles in a timely manner
 - Risks associated with other management options, including no action



Hazard Quotients for 2,3,7,8-TCDD in Fish



Making Regulatory Decisions

- The agencies intentions
 - “The HARS-Specific Values and TEF are not binding regulatory criteria. EPA Region 2/CENAN intend to use them as tools in considering the weight of evidence regarding ... suitability ...
 - “Factors that may be considered in the weight of evidence include: **variability** around the mean...**uncertainties** concerning...magnitude of accumulation...and ...HARS-Specific Values.” (p. 9)
- In application
 - “Therefore, it is possible that bioaccumulation test results for dredged material proposed for use as Remediation material at the HARS could exceed one or more of the HARS-Specific Values and/or TEF steps and still be determined to be suitable...” (p. 9-10)

Making Regulatory Decisions

- **The decision making process must be consistent and predictable**
- **Rules must be established to apply weight of evidence in this regulatory program**
- **Uncertainty in HARS-Specific Values must be quantified**
 - **How?**
 - **Probabilities**
 - **Distributions**
 - **Ranges**

“Teach yourself to work in uncertainty”

Bernard Malamud

